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Forest

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Dixie National Forest

Monitoring Report for Fiscal Year 2008



Garfield, Iron, Kane, Piute, and Washington Counties, Utah

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Table of Contents

Introduction	1
Air Quality	1
Soils	2
Water	3
Fisheries	4
Wildlife	11
Timber	17
Protection – Fire.....	21
Protection – Insect and Disease.....	22
Range	23
Developed Recreation.....	26
Scenic Quality	26
Dispersed Recreation and Wilderness	27
Cultural (Heritage) Resources	27
Facilities.....	27

Introduction

The purpose of this report is to provide Forest managers and the public with a brief look at the monitoring accomplished during fiscal year 2008 as part of implementing the Dixie National Forest Land and Resource Management Plan (Forest Plan). All references to the year 2008 refer to fiscal year 2008: October 1, 2007, through September 30, 2008. This report does not discuss individual management projects; instead, it gives an overview of specific monitoring items prescribed in the Forest Plan. More information on specific projects is available from the Dixie National Forest, 1789 North Wedgewood Lane, Cedar City, Utah, 84721.

Air Quality

Compliance with Utah State Air Quality Guidelines and Standards

All prescribed burning was implemented in compliance with the Utah Interagency Smoke Management Program. The Forest submitted the annual burn schedule to the Utah Interagency Smoke Management Coordinator. Permission to burn was given before each prescribed burn was ignited.

In 2008 Dixie National Forest fire managers complied with state air



Figure 1. Bear Valley drainage on the Cedar City Ranger District.

quality standards, with no violations for significantly contributing to particulate matter. Smoke monitoring equipment was set up in some areas that had the potential to be affected by prescribed fire and wildland fire use activities. Public complaints were monitored by local ranger districts and reported to the Utah Interagency Smoke Management Coordinator. There were fewer than five public comments about smoke concerns for all prescribed fires on the Forest.

Forest fire managers also kept the local communities and the Utah Interagency Smoke Management Coordinator and State Department of Air Quality informed of smoke production and dispersal during wildfire events across the Forest.

Soils

Long Term Soil Productivity

Two fire sites were monitored for soil productivity: the Pine Wildland Fire Use and the Pretty Tree prescribed fire on the Escalante Ranger District. These fires burned at a low severity with adequate duff remaining to protect the soil from raindrop impact and to limit erosion.

Compaction

We monitored compaction on the Buzzard and Twin Lakes timber sales on the Cedar City Ranger District in 2008. Results confirmed that compaction occurred during skidding (dragging the logs away from the harvest site) and at log landing sites. On average, 6.7 percent of the timber sale units had experienced a 15 percent increase in bulk soil density. Timber harvests do cause compaction, but monitoring results showed that the proper use of Soil and Water Conservation Practices (SWCPs) kept compaction within acceptable levels.

Upland Areas Adjacent to Riparian Management Areas

Two timber sales adjacent to riparian areas were monitored in 2008: Puma and Santa Clara stewardship projects. The Puma Stewardship Project utilized best management practices (the SWCPs) that minimized the disturbance of the soil profile with harvest and yarding equipment. This proved to be effective in minimizing the area of detrimentally disturbed soil by the equipment and the residual slash dissipates any movement of sediment off-site.

The Santa Clara Stewardship Project had minor disturbance of the soil profile and damage to the stream channel from harvest and yarding equipment. However, the disturbance proved to be short-term and the residual slash will dissipate any movement of sediment.

Soil and Water Resource Protection – Project Environmental Assessment Mitigating Requirements

Four new implementation projects were monitored in 2008. These projects showed that best management practices (the SWCPs) were effective in protecting the soil and water resources.

Soil Survey Activities

Data collection for the forest-wide field soil inventory has been completed and entered into a database (as directed in the Forest Plan, page II-52). Future analysis of this data will determine

if additional field work is needed. Soil survey work will now shift to using the database to help with project and landscape scale analysis.

Soil and Water Resource Improvement Needs Inventory

District hydrologists continue to update the forest-wide watershed improvement needs inventory. This data will be used to plan watershed improvement projects. Other district resource specialists and the hydrologists will continue to coordinate the implementation of watershed improvement projects by clearly defining objectives and developing plans well in advance of implementation.

Water

Compliance with State Water Quality Standards

Forest hydrologists sampled and analyzed water quality on the Santa Clara River and Pinto Creek, a tributary to Newcastle Reservoir, to compare the results with state water quality standards. All of our samples were in compliance with state water quality standards.

Effectiveness of Best Management Practices in Meeting Water Quality Objectives and Goals

SWCPs are recognized as best management practices with the State of Utah Division of Water Quality. SWCPs were monitored at the following two locations in 2008:

1. Buzzard Salvage Sale, Cedar City Ranger District, and
2. Twin Lakes Stewardship Project, Cedar City Ranger District.

The implementation of a properly spaced skid trail network and adherence to SWCPs relating to soil moisture operational levels and the design and management of log landings was effective in meeting water quality goals within these two timber sales.

Water Yield Increases in East Fork of Sevier Watershed

The Forest has dropped this monitoring item from consideration as we do not intend to increase the spring discharge of the Sevier River. Rather, our intent is to improve and maintain the channel, floodplain, and sponge/filter system of the watershed in such a way as to maintain a dynamic equilibrium within the watershed.

Effectiveness and Maintenance Needs of Watershed Improvements

Two previously completed projects were monitored in 2008.

1. Duck Swains Access Management Project. Phases of this project are continuing with placement of rock barriers and ripping and seeding of old road beds. The best success in restoring the old road surfaces has been where coarse woody debris has been placed on the decommissioned segments. Grass seeding has been successful.
2. South Fork Pinto Creek Road Decommissioning. This project was successful in rerouting the road away from the South Fork of Pinto Creek riparian area. The recovery of native grass/forbs and shrubs is progressing well. The reclaimed road bed is stable and not eroding.

Accomplishment of Riparian Area Management Goals



Figure 2. Stream cross section data being collected.

Measurements such as pebble counts, cross-sections, and photo points are being collected annually on streams throughout the Dixie National Forest. Data from these surveys is being used for long-term monitoring of each of the streams measured. In 2008, four sites were re-measured and compared with past surveys to detect any changes that have occurred since the cross-section was established. Although some conclusions can be deduced from these measurements, ideally, 10 or more years of data are needed to distinguish a trend in a system. We must continue to collect data for those

sites before we can infer a trend with more certainty. Initial results from four sites are summarized below including one new site as well

1. Red Creek. This survey site was established in 2008.
2. Stout Canyon. Comparing cross section surveys taken in 2004, 2006, and 2008 revealed that the bank in cross section has lost elevation. These changes are probably attributable to bankfull flows in 2007.
3. Swains Creek. Comparing previous 2004 cross section surveys to 2008 has revealed that channel bars have formed and the channel has shifted about 4 feet. These changes are probably attributable to the flooding of 2004 and the ATV crossing just above the cross-section.
4. Three Mile Creek. Comparing cross section surveys taken in 2007 and 2002 revealed that the survey was measured incorrectly in 2004. Results indicated a 5 foot channel shift and a 1 foot incision since 2004. This cross-section will need to be revisited in the near future to rectify this discrepancy.
5. Right Fork Sanford Creek. Comparing cross section surveys taken in 2004 and 2008 revealed that about 3 feet of incision has occurred in the 4 years since the Sanford fire. Since Deep, Deer and Cottonwood on the east side of the Sevier Plateau are exhibiting much the same changes, it is safe to say that this stream is still being influenced by the Sanford Fire of 2002. Substrate counts are lacking at this location.

Fisheries

Fish and Riparian Habitat

Riparian habitat and stream bank stability were monitored in inventories highlighted in the Range sect, no additional monitoring of fish habitat was completed in 2008.

Bonneville Cutthroat Trout

The Utah Division of Wildlife Resources (UDWR) is in charge of all Bonneville cutthroat trout population surveys within the Southern Geographic Management Unit for the species, including sites on the Dixie National Forest. Currently, UDWR surveys all known populations of Bonneville cutthroat trout on a seven year rotation. Since monitoring for all existing populations on the Dixie National Forest last occurred in 2001 and 2002, existing populations should be monitored in 2008 and 2009.

In 2008, population inventories (electro-shocking surveys) for Bonneville cutthroat trout were completed by UDWR at the following locations on the Dixie National Forest:

- Cedar Ranger District
 - Delong Creek
 - Indian Hollow
 - Threemile Creek
- Escalante Ranger District
 - Ranch Creek

When compared to data from 2001 monitoring, 2008 UDWR density and biomass estimates for Bonneville cutthroat trout populations decreased at stations in Delong Creek, Indian Hollow, and two of the three stations in Threemile Creek (Charts 1 and 2). Conversely, density and biomass estimates remained stable or increased at both stations sampled on Ranch Creek and station 2 on Threemile Creek. The largest declines (Indian Hollow and Threemile Creek station 1) were in areas where very few fish were collected during either sampling effort (two fish versus zero fish in Threemile Creek station 1 and five fish versus two fish in Indian Hollow). UDWR biologists speculated that ambient low flows and/or grazing impacts to riparian areas may be limiting Bonneville cutthroat populations in Indian Hollow and Delong Creek. The lower portion of Threemile Creek appears to be marginal habitat for Bonneville cutthroat trout, but does support a variety of native fish species including southern leatherside. Bonneville cutthroat trout monitoring will continue at additional sites in 2009 and 2010.

Chart 1: Kilograms of Bonneville Cutthroat Trout per Hectare at Monitoring Stations Sampled in 2001 and 2008. Data Provided Courtesy of the Utah Division of Wildlife Resources.

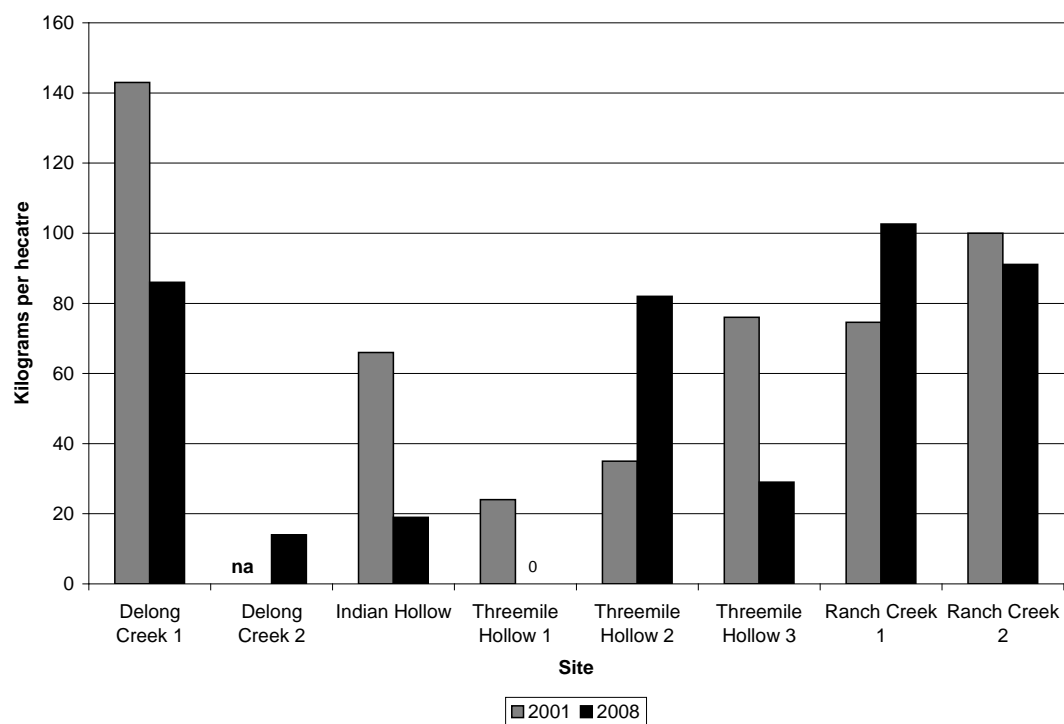
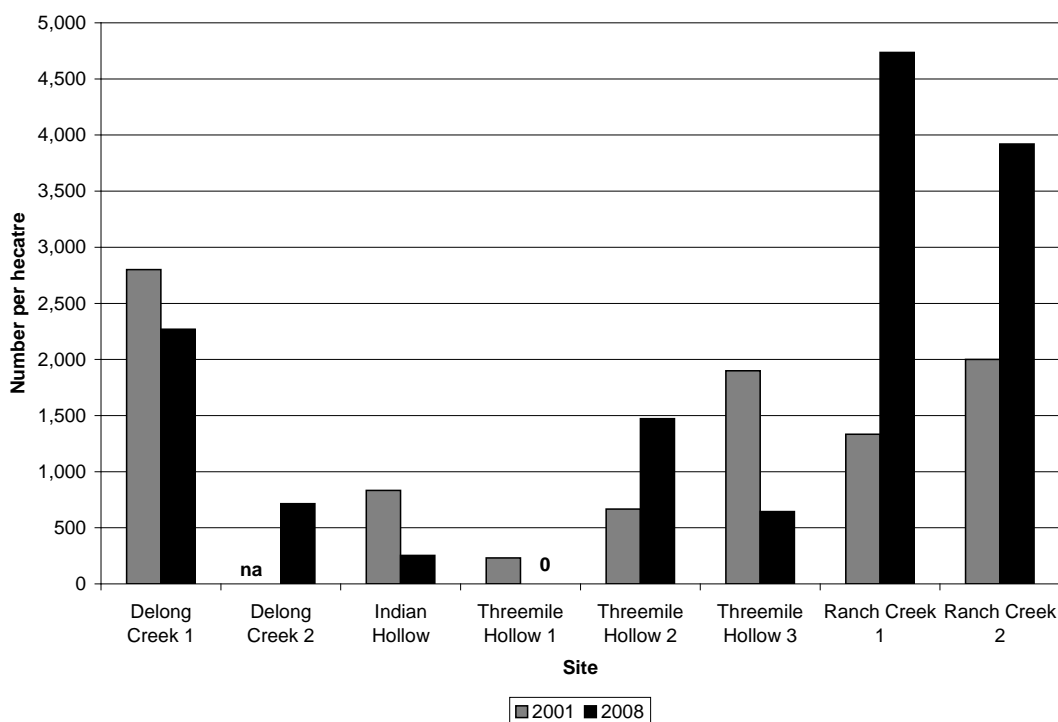


Chart 2: Number of Bonneville Cutthroat Trout per Hectare at Monitoring Stations Sampled in 2001 and 2008. Data Provided Courtesy of the Utah Division of Wildlife Resources.



Brook, Brown, Rainbow, and Cutthroat Trout

Until 2003, the UDWR was collecting the bulk of fisheries population data on the Dixie National Forest. During that time sampling locations for monitoring were determined by the UDWR with little input from the Forest. Over the past six years (i.e., 2003-2007), Dixie National Forest personnel have collected fish population data at various sites across the Forest in cooperation with the UDWR. This and future fish monitoring data should start to allow for comparisons of current/future conditions with past and desired conditions. Population inventories (electro-shocking surveys) were completed for Management Indicator Species (MIS) fish species at six locations on three Forest streams in 2008:

- Pine Valley Ranger District
 - Santa Clara River (2 sites)
- Cedar Ranger District
 - Deer Creek (2 sites)
- Escalante Ranger District
 - Bear Creek (2 sites)

With the exception of the upper sampling site on Bear Creek, recent Forest monitoring data was available on fish density and biomass from stations close to all 2008 monitoring sites (Charts 3 and 4). The 2008 monitoring efforts on the Santa Clara River and Deer Creek showed fairly large increases in trout density and biomass over historical sampling efforts conducted near the 2008 stations. Historical sampling data provided for Deer Creek was taken from sampling

efforts at essentially the same locations in 2003, while historical data from the Middle Fork of the Santa Clara River was taken from sampling efforts at a station on the Left Fork of the Santa Clara River in 2005. Similarly, historical data provided for the Santa Clara River was from sampling efforts conducted close to this location in 2005.

Unlike data from the Deer Creek and Santa Clara River stations, data collected at the lower Bear Creek site in 2008 showed a drastic decline in the number of brook trout per mile when compared with historical data from sampling efforts in essentially the same location in 2003. This monitoring station was within the area impacted by the Bear Creek Fire, which burned approximately 1,068 acres within the Bear Creek drainage in July 2008. Approximately 1.6 miles of Bear Creek in the burned area contained fish and 0.5 miles of the fish-bearing area were in a moderate to high severity burn area. In this more severely burned area, virtually all riparian vegetation was burned, eliminating overhead shade. Visits immediately following the fire showed evidence of a localized fish-kill within this area; however, live brook trout were observed both upstream and downstream outside of the more severely burned area. The lower Bear Creek station was within the burned area and confirmed that fire-related impacts had a negative effect on the brook trout population; however, the sampling station established upstream confirmed that a source population for brook trout exists for recolonization throughout the burned area.

Streams without native cutthroat trout monitored in 2008 were chosen because of their direct relevance to project-level environmental analysis. Data from each stream are indicative of local conditions at the time of the survey, and should not be extrapolated beyond the stream in question. Overall, non-native trout fisheries (i.e., brown trout, brook trout, cutthroat trout, and rainbow trout), are stable across the Forest (Rodriguez et al. 2008). These fisheries are maintained through both natural recruitment and UDWR stocking programs.

Chart 3: Kilograms of Trout per Hectare in Selected Forest Streams in 2008 and in Other Recent Samplings at or Near Those Areas

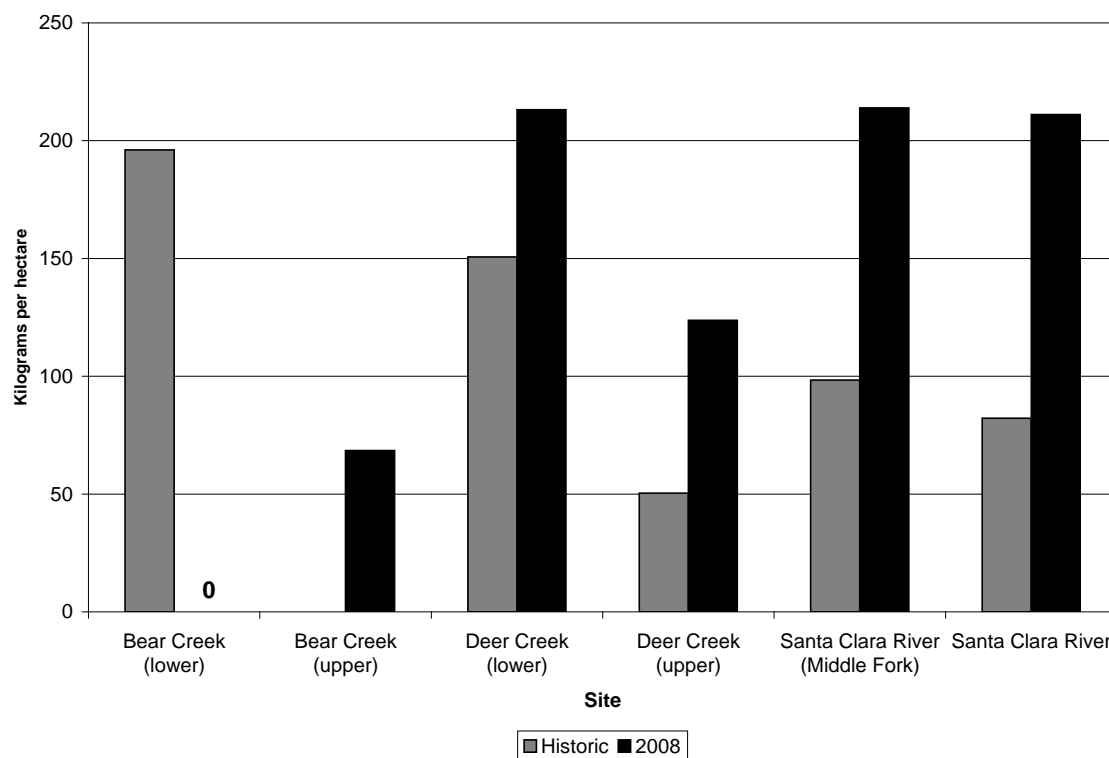
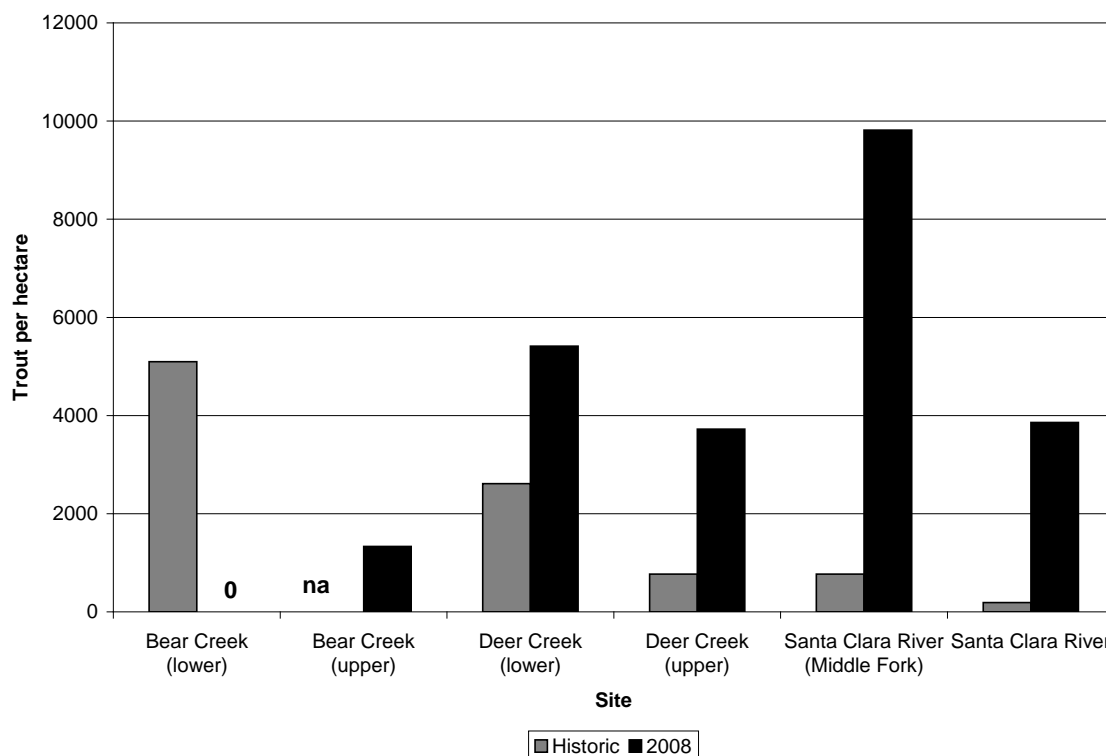


Chart 4: Number of Trout per Hectare in Selected Forest Streams in 2008 and in Other Recent Samplings at or Near Those Areas



UDWR also conducted trend netting on the following Forest lakes in 2008:

- Cedar City Ranger District
 - Panguitch Lake
 - Navajo Lake
- Escalante Ranger District
 - Barker Reservoir
 - Lower Barker Reservoir
 - Posey Lake

UDWR conducts active stocking of brook trout and rainbow trout in Barker and Lower Barker reservoirs, as well as in Posey Lake and Navajo Lake. Navajo Lake is also stocked with splake. Panguitch Lake is currently being stocked with Bear Lake cutthroat trout, rainbow trout, and Bonneville cutthroat trout. Total number of trout per net night in Barker Reservoir was considerably lower in 2008 (13) than when it was last netted in 1990 (76). UDWR attributed this to increased harvest of brook trout and recommended increasing stocking numbers of that species. Lower Barker Reservoir had a catch rate of 16 fish per net night. No prior netting had occurred at this location, so no change in management was proposed. The Posey Lake netting showed trout per net night, along with 2 Arctic grayling. UDWR proposed discontinuing the stocking of Arctic grayling unless angler reports showed more success from the original stocking efforts.

While spring gill netting in Navajo Lake showed that the number of trout per net night (124) was well above the long-term average (30), rainbow trout appeared to have seen a larger= amount of winter kill in 2007-2008 with only one rainbow trout being collected. Conversely, the splake catch doubled from 2007. Therefore the UDWR recommended reducing numbers of splake to be stocked while maintaining rainbow and brook trout stocking numbers.

Panguitch Lake netting efforts showed that trout catch rates were near long-term averages, but that condition factors were at all time highs (Hepworth et al. 2009). Additionally, no Utah chub were collected which continues to indicate that the 2006 rotenone efforts were successful. As the fishery continues to rebound from the treatment, additional changes to fishing regulations and stocking protocols will be considered.

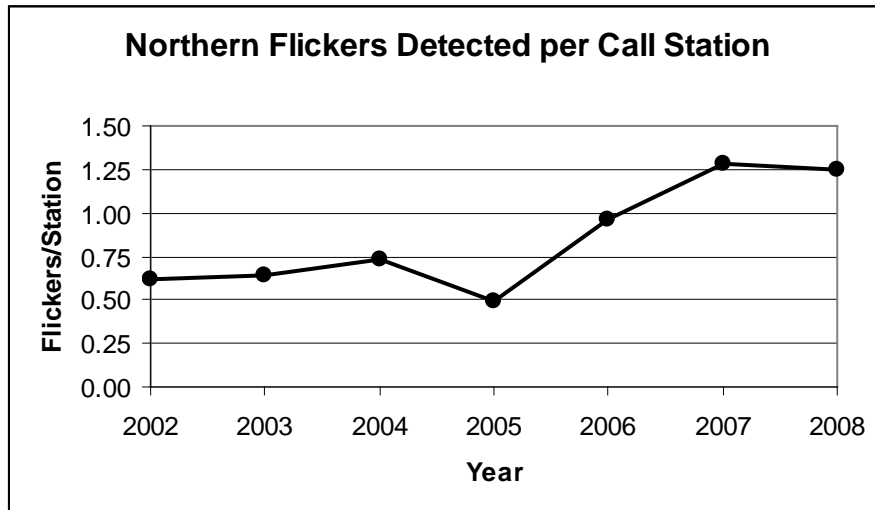
Wildlife

Common Flicker

A total of 558 flickers were detected in surveys of 446 call stations, resulting in a detection rate of 1.25 flickers/station. This is a slight decrease from 2007, but higher than in years prior to 2007. The variation in detection rates could be due to changes in precipitation, insect populations, and weather conditions during the monitoring period.

Table 1. Northern Flicker Detections per Call Station 2002-2008

Year	Flickers detected per call station
2002	0.62
2003	0.64
2004	0.74
2005	0.49
2006	0.96
2007	1.28
2008	1.25

Chart 5. Northern Flicker Detections per Call Station 2002-2008

Flickers occupy a wide range of cover types, from low elevation pinyon/juniper woodlands to high elevation spruce ecosystems. Because this species occurs in a broad range of cover types, many factors can affect population size and distribution. Protective measures exist under the snag and downed woody debris standards and guidelines section of the Forest Plan. These measures are implemented forest-wide, and are effective in managing and protecting important habitats for cavity nesters such as flickers. In addition, the Forest is currently experiencing heavy conifer mortality due to insects such as the spruce and mountain pine beetles. As a result, snags and downed woody debris are in abundance in many areas across the Forest.

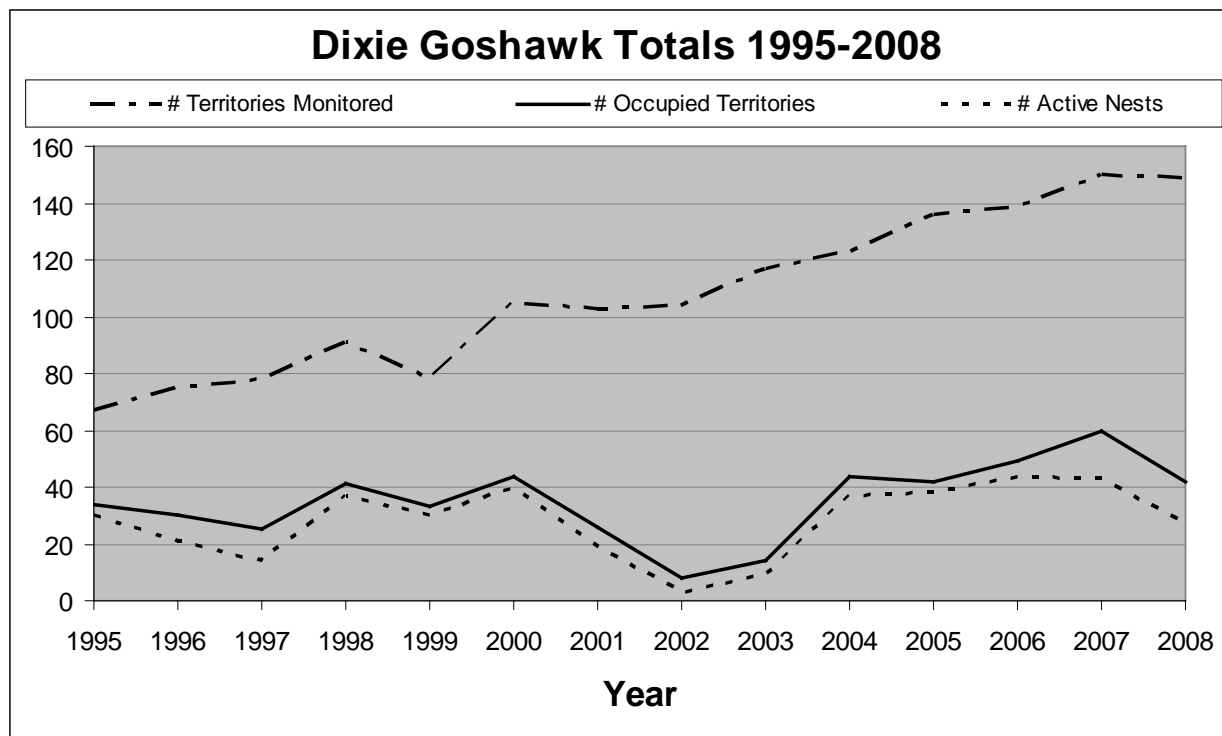
Northern Goshawk

Out of 162 existing goshawk territories on the Dixie National Forest, 149 were monitored in 2008. Table 2 shows goshawk monitoring results for the last five years. There were 130 known territories in 2004. The increase in known territories is due to the discovery of new territories and the division of some individual territories into two. Additional territories were very likely occupied, but the absence of bird detections during the site visit prevented categorizing them as such.

Table 2. Summary Results of Northern Goshawk Monitoring on the Dixie National Forest, 2004-2008

Northern Goshawk Monitoring Results					
Status	2004	2005	2006	2007	2008
Territories Monitored	123	136	139	150	149
Occupied Territories	44	42	49	60	41
Active Nests	37	38	44	43	28

Chart 6. Results of Northern Goshawk Monitoring on the Dixie National Forest, 1995-2008



The total number of occupied territories in 2008 decreased from 2007. This decrease is likely due to climatic effects as goshawk breeding appears to be influenced by weather. Factors such as temperature and timing and amount of precipitation affect goshawk distribution, survival, and reproduction. Climatic factors also impact prey species population size and distribution. Although overall numbers fluctuate, occupied territories are well-distributed across the Forest, occurring on all five ranger districts. These results may indicate that our present method of protecting this species is adequate. Territories will continue to be monitored closely.

Mule Deer and Rocky Mountain Elk

All big game species in Utah are managed by the UDWR. The Regional Advisory Council (RAC) process is used to make population number recommendations, and the Utah Wildlife Board makes all decisions on population management. The Forest Service has a representative on the RAC; however, the Forest in no way has control over population numbers. Big game populations can and will fluctuate annually and are not controlled by the Forest Service. Post season numbers are taken after all harvest has occurred for that year.

Table 3. Elk Population Numbers by Hunt Unit

Hunt Unit	Management Plan Objective	Population Estimate Post 2005	Population Estimate Post 2006	Population Estimate Post 2007	Population Estimate Post 2008
Mount Dutton	1,500	1,600	1,270	1,400	1,500
Plateau Boulder	1,500	400	500	900	1,483
Paunsaugunt	200	75	24	30	50
Panguitch Lake	1,100	1,150	872	950	1,000
Zion	300	300	300	500	500
Pine Valley	50	30	50	50	50

Source: UDWR.

Table 4. Mule Deer Population Numbers by Hunt Unit

Hunt Unit	Management Plan Objective	Population Estimate Post 2005	Population Estimate Post 2006	Population Estimate Post 2007	Population Estimate Post 2008
Mount Dutton	2,700	1,700	2,000	2,300	2,000
Plateau	25,000	15,400	17,000	15,800	12,000
Paunsaugunt	5,200	5,100	6,500	6,600	6,000
Panguitch Lake	8,500	7,150	8,925	8,700	10,000
Zion	9,000	6,600	7,000	7,350	9,500
Pine Valley	12,800	11,700	12,500	13,400	13,400

Source: UDWR.

Mule deer occupy a wide range of cover types, ranging from high mountains and canyons to side hills and lower elevation sagebrush dominated rangelands. They favor conditions where there is an adequate food supply mixed with cover types such as stands of aspen, conifer species, and draws. In the summer season deer tend to favor the higher elevations, and during the winter season they migrate to lower elevations to avoid heavy snow pack and lack of food. There are many factors that contribute to and affect the population and distribution of mule deer. Deer units; Paunsaugunt, Panguitch Lake, Zion, and Pine Valley are either at objective or are moving towards unit objectives. The Mount Dutton and Plateau unit estimations have experienced more fluctuations and have room to increase.

After reviewing UDWR data, deer populations appear to be healthy and will continue to persist across the Forest. No data demonstrates a downward trend to trigger some level of recommendations to the state to do something different with their management. The UDWR elk data demonstrates fluctuations in population numbers due to the amount of hunting pressure and the number of depredation issues. This is evident in the Paunsaugunt unit where a number of antlerless tags have been issued based on depredation concerns on private property, and total numbers decreased. This unit fluctuates up and down depending upon depredation issues. Elk from surrounding units such as Panguitch Lake and Mount Dutton will continue to move through this unit and will continue to provide opportunities for growth; however, growth will

only be allowed based on approved elk management plans and depredation issues. The Forest has no concerns for the persistence of elk across the Forest, and therefore, big game populations across the Forest are well distributed and will continue to persist.

Arizona Willow

Of the 12 monitoring sites on the Forest, 11 were monitored last year. The condition of the Arizona willow sites monitored across the Forest in 2008 has been documented in a separate annual report. In summary of this report, the overall condition of Arizona willow is good, as 8 of the 11 sites that were monitored for new growth last year have new growth present at the end of the growing season. Plants monitored in 2008 demonstrated numerous production of catkins (fruiting bodies) over previous years. Sufficient funds and resources were available to achieve the monitoring objectives for 2008, and should be maintained in order to continue to monitor this species as a Region 4 sensitive species, as well as to implement the conservation strategy and agreement.

Mexican Spotted Owl

The 2003 U.S. Fish and Wildlife Service (FWS) survey protocol was used to survey and monitor for Mexican spotted owls in 2008. Nighttime calling was conducted generally between the hours of 2100 and 0200. One spotted owl detection was recorded during survey efforts at the North Canyon Protected Activity Center (PAC) in 2008. One additional detection was made on the Fremont River Ranger District (the former Teasdale Ranger District portion) on the east side of the Boulder Mountain. This detection was an audio location approximately 5 air miles from the Sheets Gulch PAC. This new detection has been named the South Fork of Oak Creek, and a PAC has been identified and delineated.

Habitat Connectivity Within 5th and 6th Order Watersheds

The King's Creek Campground thinning project on the Powell Ranger District was reviewed for implementation of connective corridors in 2008. Based on information collected, the connective corridors that were identified in the overall landscape for this project were maintained during the implementation portion of this project. The Kings Creek area is currently impacted by the campground; however, it does supply some level of suitable habitat for the goshawk and its prey. Although the general area of this project has had varying degrees of timber management activities, connective corridors have been maintained to various degrees.

Due to the cumulative effects from other projects in the area, there is a general lack of tightly spaced groups and clumps of trees in the Tropic Reservoir area. However, adequate habitat remains in place to allow goshawks to move freely through the area and hunt along way if necessary. To the east many of the campground stands have been managed for timber production; however some areas continue to provide connective corridors for the goshawk and its prey.

Based on our best professional judgment areas such as the east and west slope of the Boulder Mountain and the north end of Mount Dutton all continue to provide good connective corridors to adjacent watersheds (Graham et al 1999). Many connective corridors exist across the Forest on each Ranger District, however, in the project area described above, the corridors and protection areas are minimal.

Snag Habitat Maintained in Desired Spatial Arrangement

A total of 35 transects were monitored for snags on the Cedar City, Powell, Escalante, and Teasdale portion of the Fremont River ranger districts (RDs) in 2008. On the Cedar City RD, 13 transects were conducted in Engelmann spruce habitat, six transects in ponderosa pine, four transects in quaking aspen, four transects in Douglas fir, and two transects in mixed conifer habitat. The Engelmann spruce transects were conducted at Midway, Sidney, and Blowhard. All 13 transects were calculated to be above the guideline number of 300 snags per 100 acres (snags greater than 18 inches dbh). The mixed conifer snags levels at Deer Valley were above the guideline numbers. Ponderosa pine transects were conducted at Strawberry and Strawberry Ridge. Three of the four transects at Strawberry Ridge and both of the transects at Strawberry were above the guideline numbers for snags. Three of the four Douglas fir transects conducted at Navajo Peak were calculated above the specified guideline. The quaking aspen transects was conducted at Lowder Creek and one of the four transects was above the guideline for snags.

On the Powell RD, four transect were conducted in ponderosa pine and mixed quaking aspen/Douglas fir. There were two Ponderosa pine transects surveyed at Coyote Hollow and one at Lower Blue Fly. The Lower Blue Fly transect was above the guideline and the two Coyote Hollow transects fell below the guideline for snags. The quaking aspen/Douglas fir transect at Robison met the guideline numbers for snags. On the Escalante RD, there was one transect conducted at Henderson Canyon in ponderosa pine habitat. The transect had no snags reported. On the Teasdale portion of the Fremont River RD, there was one transect conducted at Pine Creek in juniper habitat. The transect had no snags reported. Based on these data, snag numbers are adequate in the cover types sampled across a portion of the Forest. Therefore, snag dependant and associated species have adequate habitat and will continue to persist.

Downed Woody Material and Logs Maintained in Sufficient Amount, Sizes, and Spatial Locations

Four of the five ranger districts on the Dixie National Forest were monitored for downed woody debris and log size in 2008. The guidelines for weight, in tons/10 acres for course woody debris greater than or equal to 3 inches in diameter, were met for all cover types. Based on this data, the amount of dead and the recruitment of dead from bark beetle outbreaks and fire, wind events, and natural recruitment related to ecological process, the down woody debris is adequate to support goshawk prey.

Grazing Management and “At Risk” Goshawk Locations

Currently there are no goshawk territories on the Forest that have been identified as being threatened by livestock grazing; therefore, no “At Risk” areas have been delineated. Data collected by Mark Madsen in 2008 demonstrates that range condition was found to be functioning on 92.5 percent, and 7.5 percent was found to be not functioning (Madsen, Long Term Vegetation Trend Study 2008).

Timber

Timber Harvest Area

Acres harvested are monitored annually and compared with the Forest Plan projected average of 10,525 acres per year. An average of 3,535 acres in timber sales were sold annually from 1987 to 2008. The average acres harvested in timber sales sold from 1987 to 2008 was 3,066 acres.

Table 5. Timber Sale Acres Sold and Harvested, 1987-2008

Year	Total Acres Sold	Total Acres Harvested
1987	5,656	84
1988	5,369	2,946
1989	7,193	3,590
1990	5,184	7,454
1991	7,403	5,029
1992	2,907	6,629
1993	4,366	4,962
1994	2,044	3,807
1995	822	1,411
1996	11,762	4,068
1997	5,131	6,600
1998	4,092	3,743
1999	2,695	3,332
2000	1,553	6,196
2001	536	1,173
2002	804	990
2003	449	856
2004	2,266	144
2005	1,500	539
2006	230	723
2007	4,604	1,354
2008	1,191	1,824
Total	77,757	67,454

Timber Research Needs

Research was initiated in 1991 to study the survival and growth differences between spring and fall lifting of nursery seedlings. The results of this information will determine the best time to lift seedlings from nursery beds so as to provide the best survival and growth.

The Forest, in conjunction with Forest Pest Management (FPM), implemented a study on timber harvest and slash treatment methods to control the spread of Tomentosus root rot in Engelmann and blue spruce. The study began with the first treatment in 1984. Another series of study plots were established in 1989. This is long-term study to assess the results of the various treatments, with no results to report yet.

Suitable and Unsuitable Land Classifications

The table below shows the number of timber sales and acres verified for timber suitability from 1987 to 2008.

Table 6. Number of Timber Sales and Acres Verified for Timber Suitability, 1987-2008

Ranger District	Number of Sales	Total Acres Verified
Cedar City	38	119,809
Escalante	18	95,173
Powell	5	27,992
Teasdale	14	25,505
Total	62	268,479

The Forest Plan identified 300,100 acres of land suitable for timber, which is greater than the total of 268,479 acres above. However, an accurate comparison is not possible until we complete the classification program, which is still underway.

Harvest Practices in Retention/Partial Retention

Of 131 timber sales planned and implemented from 1987 to 2008, 43 had no mitigations identified in the landscape architect report. Of the remaining 88 sales for which mitigations were recommended, all contained the mitigations in the environmental document and in the silvicultural prescription. Of these 88 sales, 7 have documentation of post sale monitoring completed by a landscape architect, and 10 sales are still in progress. The remaining 71 sales have no documentation of post sale monitoring. On three sales the Visual Quality Objectives (VQOs) were not met in the first Forest Plan decade (1987-1998) because bark beetle suppression objectives took priority over full accomplishment of visual quality objectives.

VQOs were documented as met on four completed sales (6 percent) of those with mitigation measures identified in the landscape architect report. There is no documentation to determine if VQOs were accomplished on the remaining 94 percent of the completed sales for which mitigation measures were identified.

Harvest Practices in Riparian Areas

Riparian areas ranging from isolated springs to streams and ponds were present on 28 of the reviewed sales. Twenty-six sales included the riparian areas in the final layout. The hydrologist's recommendations were tracked through the environmental analysis, silvicultural prescription, marking guidelines, and contract/sale area map in the documents. A review of silvicultural prescriptions suggests that existing timber sale contract provisions, when fully implemented with a map, are adequate to protect and maintain riparian areas in their existing condition.

During project planning, specific restrictions (buffer zones) or special harvesting practices intended to protect riparian areas were identified. Most of these were carried into the environmental analysis as stated in the report. Recommendations were based on informal field visits. Several projects contain general recommendations such as "protect riparian areas." Most of these recommendations were included in the environmental analysis.

Twenty-one of 26 sale area maps showed the riparian areas identified by the hydrologist. Eighteen of these showed all of the riparian areas identified. The riparian areas have been adequately protected in 17 of 18 sale areas that were reviewed on the ground.

Adequate Restocking

Most areas that were harvested through a final harvest treatment prior to the adoption of the Forest Plan have regenerated to an adequate restocking level. Most of the acres planted since 1990 have been associated with the Engelmann spruce bark beetle epidemic, which has destroyed most of the spruce on the Forest. We expect this work to continue for the next decade.

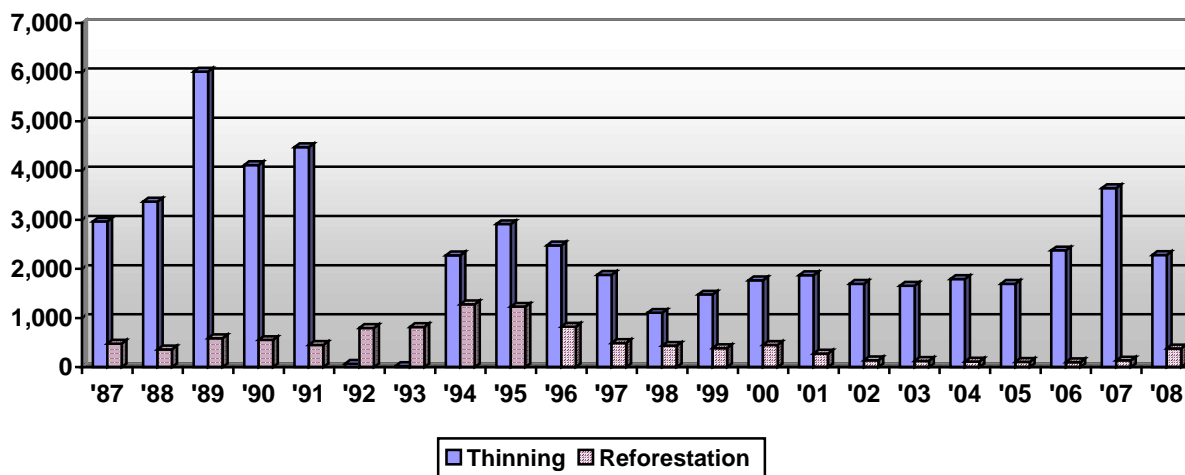
Drought has affected survival of young trees; however, the use of containerized seedlings has improved seedling survival, especially on basaltic soils. Survival rates exceed 80 percent following three years after planting. Survival rates for 2008 for both 1st and 3rd year were 99 percent and 91 percent respectively.

Maximum Size of Openings Created by Clearcuts

Numerous areas less than 40 acres in size were clearcut from 1987 to 2008 to meet disease control objectives. There have been no perceived or recorded adverse effects to harvest practices, visual quality, or other resources values because of the size or location of the clearcut.

Reforestation and Timber Stand Improvement (TSI) Accomplishment

Thinning and reforestation accomplishments to date have not met the projections of the Forest Plan due to the decline in the timber harvest program and the accomplishment of most thinning needs early in the monitoring period. The Forest Plan projected 5,000 acres per year in thinning and 1,588 acres per year in reforestation. See Chart 7 below for thinning and reforestation acres for 2008 and previous years.

Chart 7. Acres Thinned and Reforested, 1987-2008

Fuelwood Consumption and Supply

Vegetative management practices on the Forest result in the availability of an estimated 14,000 cords of fuelwood annually. During the first five years of the Forest Plan period, an average of 7,446 cords of fuelwood was utilized each year. After natural gas was delivered to the major population centers in the area, the fuelwood consumption has declined to approximately 5,000 cords per year. In the past 10 years, the Forest has experienced catastrophic Engelmann spruce tree mortality due to a spruce bark beetle epidemic. This has resulted in thousands of acres of dead trees and heavy volumes per acre of fuel loading, contributing to an increasing amount of fuelwood availability.

Growth Responses

A random sample of 581 trees measured in the 1990 Forest inventory showed a diameter growth of 0.7 inches per 10 years in natural stands. Post-harvest growth studies conducted in managed stands in 1991 showed a diameter growth of 1.6 inches per 10 years. This suggests that growth response to managed timber stands is positive.

Timber Supply Projections

The latest Forest inventory (1998) showed the following results regarding sawtimber on non-reserved timber lands (i.e., lands not specifically designated for timber harvest):

- Net volume is 3,534,863 MBF (thousand board-feet),
- Net annual growth is 45,134 MBF, and
- Annual mortality is 53,763 MBF.

Protection – Fire

Adequacy of Fire Prevention Programs

We measure the adequacy of our prevention programs by the number of human-caused fires. As shown in the table below, there were 11 human-caused fires with a total of 3,659 acres burned in 2008. All but three of the acres are attributed to two of the 11 fires. Extreme fire danger conditions in June contributed to the growth of the two large fires, both human-caused, that occurred in 2008. Fire restrictions were enacted following the start of the second fire, resulting in a marked decrease in both starts and acres burned by human caused fires.

Table 7. Number and Acres of Human-caused and Lightning-caused Fires in 2008

Type of Fire	Number of Fires	Acres Burned
Lightning-caused (suppression)	33	10
Human-caused	11	3,733
Wildland fire use	5	1,660
Total	49	5,403

Number of Wildfires and Acres Burned

In 2008 a total of 5,403 acres were burned. Five of these naturally-started (lightning) fires were managed to achieve resource benefit, while all others were successfully suppressed.

There were 33 wildfires on the Forest in 2008, with the 10 acre total distributed across the Forest. Fires managed for resource benefit burned on the Cedar City Ranger District (704 acres), Powell Ranger District (294 acres), Escalante Ranger District (300 acres), and Pine Valley Ranger District (362 acres). The largest fires on the Forest were the human-caused Corn Creek and Bear Creek fires, which burned 2,269 and 1,464 acres, respectively, both on the Escalante Ranger District.

Fire Management Effectiveness Index

We no longer use this method of reporting because it does not adequately measure success of the fire program. As a surrogate for this obsolete metric, initial attack effectiveness is calculated. Of the 44 fires that were managed with a suppression strategy in 2008, only two escaped initial attack efforts. This equates to a 96 percent initial attack success rate for this year. This high success rate also means that suppression expenditures were minimized. Typically, higher suppression costs are attributable to larger fires.



Figure 3. Bear Creek Fire on the Escalante Ranger District.

Compliance with Fuel Loading Standards

The Dixie National Forest used prescribed burns and mechanical treatments to reduce fuel loading. Fuel treatment effectiveness was monitored across the Forest by establishing and re-measuring sampling locations for both fuels treatments and wildland fire use. In 2008 the Forest treated 5,015 acres using prescribed fire and 6,680 acres using mechanical treatments for a total of 11,695 acres treated. This is down from 17,183 treated acres in 2007.

Protection – Insect and Disease

Population Levels of Insects and Diseases

Localized mountain pine beetle (*Dendroctonus ponderosae*) and western pine beetle (*Dendroctonus brevicomis*) buildups have been observed over the years as sustained drought conditions have created greater moisture stress and stand susceptibility, particularly in older trees. Approximately 2,000 mountain pine beetle infested trees were treated in the Panguitch Lake Campground in an attempt to retain the important tree cover at that site. In 2002 the campground was non-commercially thinned to reduce tree densities and subsequent risk of bark beetle infestation. The pine bark beetle, along with limb rust and mistletoe, is slowly killing the over-mature ponderosa pine on the Forest.

A spruce bark beetle (*Dendroctonus rufipennis*) population grew to epidemic levels on the Cedar City Ranger District in the early 1990s. The beetle outbreak spread across the Markagunt Plateau, essentially killing all of the over-mature/mature and intermediate Engelmann spruce trees over thousands of acres. By 2003, the Engelmann spruce component on the Cedar City Ranger District had been altered from an over-mature stand structure to total

stand replacement in some areas and small seedling/saplings in others. Over the next century the spruce-dominated landscape will revegetate to seral aspen stand structure.

In the mid to late 1990s, the spruce beetle population grew to epidemic levels on Mount Dutton on the Powell Ranger District. Here, too, the mature/over-mature spruce stands have been replaced with aspen and subalpine fir because of the Engelmann spruce mortality. In the early 2000s the spruce beetle was active on the Escalante and Teasdale ranger districts, having developed to epidemic levels, killing mature spruce trees that survived the spruce beetle outbreak as seedlings and saplings in the early 1920s.

Recently the Douglas-fir bark beetle (*Dendroctonus pseudotsugae*) and fir engraver beetle (*Scolytus ventralis*) populations have been building and killing large areas of Douglas-fir and white fir trees. The pinyon ips beetle population has reached epidemic levels in some areas in the pinyon/juniper type and has killed large areas of pinyon pine.

Root rot continues to be widespread. A research/treatment program initiated in the Peterson Grove area on the Teasdale Ranger District and localized treatments have been prescribed in timber sale projects. Results of the research and treatments are pending. Timber sale prescriptions and cultural treatment activities appear to have reduced the incidence of limb rust in ponderosa pine.

Insects and disease have increased over the past 10 years overall. This has prompted more dead spruce salvage and delayed other treatment activities.

Effectiveness of Dwarf Mistletoe Suppression Projects to Protect Regeneration

Dwarf mistletoe treatments have been prescribed in all affected timber sale project areas initiated in the period since the Forest Plan was adopted in 1986, and thousands of acres within individual control projects have been completed. Permanent plots have also been established to monitor the long-term effects of mistletoe on tree growth, though these studies are not complete at this time.

Treatment prescriptions and projects have been successful in reducing localized dwarf mistletoe infections. However, the disease continues to be widespread in many stands, requiring continued emphasis on treatment and management.

Range

Range Vegetation Condition and Trend

During 2008, 186 long-term trend monitoring studies were completed on the Dixie National Forest. Thirty-five of these monitoring studies were Level III Riparian Inventories, 104 were upland range trend monitoring studies, and 47 were photo points completed by Forest personnel. Only 16 of the 104 Forest Service upland range trend monitoring sites were replicated studies from which accurate trend data can be derived. Five of the 47 photo points were replicated; photo interpretive trend on these sites is available. There were no replicated Level III Riparian Inventories performed during 2008.

Of the 16 replicated upland range trend monitoring studies, the data analysis on 10 of them indicate a downward trend in vegetation condition, effective ground cover, and/or frequency of invasive species. The other six sites demonstrated stable or upward trends. However, neither a general trend for Forest range conditions nor a determination in a need for a change in management direction can be determined from this data. All 16 of these monitoring sites that indicate both upward and downward trends are located in the Cove Mountain/Bull Complex, Dammeron, and Blue Springs wildfire burn areas (burned in 2005 and 2006) on the Pine Valley Ranger District. These burned areas are highly susceptible to cheatgrass invasion and low effective ground covers resulting from reduced fuel loads. The reasons that 10 of these sites exhibit a downward trend between 2005 and 2008 are because cheatgrass frequency continues to increase and effective ground covers are still low from these recent fires. These areas still need time for vegetation recovery following the wildfires.

Of the five replicated photo points re-taken on the Dixie National Forest, four demonstrated upward trends and one demonstrated a stable trend. Based on this evaluation of this range condition and trend data, no further evaluation or changes in management direction are proposed.

In 1986, the Forest Plan did not define vegetation and soil (ground cover) conditions that would serve as a baseline from which to measure. Therefore, there are no reference conditions (from 1986) from which to measure trend. Since there is no baseline, sole reliance is placed on measuring trend during a defined time frame, from one long-term trend study reading to another. Therefore, variation that would cause further evaluation may be appropriate. Of the 186 monitoring studies and photo points reported here, 21 (11 percent) had previously established baseline studies using current methodologies where accurate trend data or photo interpretation could be derived. Other study sites may have previous readings, but this data was collected using various methods that are not compatible with current measurements and/or locations and photos were not replicated. In the absence of periodically recorded post-1986 data, we cannot project a clear picture of how much the range has improved or declined over 1986 levels on the Dixie National Forest.

The Forest has established a long-term monitoring program, as indicated by the number of studies re-read or established during 2008 and in previous years (379 Forest Service upland range trend monitoring studies, 164 Riparian Level III Inventories, and 122 photo points from 2004-2008).

Over time, these studies will be repeated and trend data will become available. This data is stored in a retrievable database where it can be accessed and additional repeat studies can also be stored and compared.

Riparian Condition

Successional Status. The Forest Plan requires the Forest to “maintain at least 70 percent of the linear distance of all riparian ecosystems in at least an upper mid-seral successional stage” (General Direction, Standard and Guideline 4B, p. IV-42). In a sample of 35 riparian areas across the Forest during 2008, 26 of the sampled riparian areas, or 74 percent, are in a mid or upper (late or PNC – Potential Natural Community) successional stage, and nine riparian areas, or 26 percent, are in a very early, early, or early to mid successional stages. Therefore, we have met this Forest Plan standard and guideline for riparian areas. No further evaluation and/or change in management direction is needed.

Stream Bank Stability. Forest Plan standards and guidelines for bank stability (General Direction, Standard and Guideline 4A, p. IV-42) and wildlife and fish (General Direction, Standard and Guideline 6B, p. IV-33) require that we “maintain 50 percent or more of total stream bank length in stable condition.” Out of the 35 Level III Riparian Inventories sampled on the Dixie National Forest in 2008, 31, or 89 percent, had streambank stability ratings that were rated as moderate, good, or excellent. These ratings indicate long-term stable bank conditions in these riparian areas. There were no sample sites evaluated for the East Fork of the Sevier River drainage in 2008. The 2008 sample of riparian areas on the Dixie National Forest are meeting this Forest Plan standard and guideline. Therefore, no further evaluation and/or change in management direction is needed.

Percent Ground Cover. Forest Plan standards and guidelines for ground cover in riparian areas require that we “maintain ground cover of at least 70 percent within riparian areas” (General Direction, Standard and Guideline 3C, p. IV-41). Out of the 35 Level III Riparian Inventories sampled on the Dixie National Forest in 2008, 29, or 83 percent, had ground cover of at least 70 percent along the greenline. Six study sites, or 17 percent, had ground cover of less than 70 percent along the greenline. Four of the six study sites that are below the Forest Plan standard have reduced ground cover resulting from wildfires that burned in 2002 and 2004. Ground cover on these sites is not expected to fully recover for several years to come. Percent ground cover on these sites not meeting the standard will need to be evaluated to determine if a change in management is needed and able to improve them.

Forage Utilization

During the 2008 grazing season, 51 of 81 allotments (63 percent) were monitored for forage utilization. Stubble height, ocular reconnaissance, and photo documentation were the primary methods used for assessing utilization.

Overutilization in the West Pinto Allotment (Pine Valley Ranger District) was limited to Holt Canyon, despite partial early removal of livestock from the allotment. Six active allotments were monitored in 2008.

For the most part livestock came onto the Cedar City Ranger District on time and with permitted numbers. The south section of the Red Creek Allotment was vacated 20 days early when authorized use levels were reached. Poor distribution and pasture integrity as well as a difficult rotation schedule were contributing factors. All other allotments exited the district as scheduled. Over all only five out of 89 pastures exceeded use; however no use exceeded 15 percent beyond authorized use. Minimum riparian stubble heights were exceeded in two pastures: the Three Mile Pasture on the Little Valley Allotment and the Three Creeks Pasture on the Three Creeks Allotment both were documented as being heavily impacted by an exploding rabbit population. All active allotments were monitored in 2008.

Ten active allotments on the Powell Ranger District were monitored in 2008. Utilization levels were at 50 percent (authorized use) or less on all allotments monitored.

All of the active allotments on the Escalante Ranger District were monitored in 2008. Over all only seven of the 31 pastures monitored exceeded authorized use levels, six of the seven by less than 10 percent. However, utilization levels were exceeded by 30 percent on the Sweetwater Pasture on the Sand Creek Allotment. Minimum stubble heights were exceeded in seven pastures: Big Swale/Clayton and Pollywog on the Coyote Hollow Allotment, Horse Creek on the Horse Creek Allotment, Main Canyon on the North Creek Allotment, Pine Creek/Roger

Peak on the Pine Creek Allotment, Sweetwater on the Sand Creek Allotment, and Willow Springs on the Upper Valley East Allotment.

Wild Horse Numbers and Habitat Trends

The estimated population of 89 horses on the North Hills Territory on the Pine Valley Ranger District includes 25 known domestic horses that have been turned out with the wild horses. Population estimates are computed at a 17 percent natural increase per year based on the past 20 years of record keeping for this horse territory. Wild horses spend about 10 months on National Forest System lands due to the availability of permanent water. This estimate does not include nine head that are known to be outside the designated territory and have taken up residency on the neighboring cattle allotment.

Domestic horses are being turned loose on the Territory by unknown private entities. It is likely that more domestic horses will be released illegally on the Territory in coming years because of the high price of hay and because many horse slaughter plants in the United States have been shut down.

Developed Recreation

Facility Capacity and Developed Site Service

During 2008 the Persons At One Time (PAOT) figure for all developed recreation sites was 8,374 daily with a seasonal capacity of 1,928,997 PAOT days. During 2008 the Forest had a total of 913,610 PAOT days to standard on the Forest.

Downhill Ski Use

Brian Head Resort reported 132,522 skier visits for the 2007-2008 for winter season.

Scenic Quality

Driving for pleasure to see and recreate in outstanding scenery continues to be the number one recreation use on the forest and the nation (National Visitor Use Monitoring 2008).

The landscape integrity or the intactness of the landscape has been degraded in the past 15 years by bark beetle outbreaks in ponderosa pine, spruce and Douglas fir stands in many places throughout the Forest. Seeing dead trees is a natural occurring process; however, the scale and magnitude of these events trigger a change in landscape character and does not meet scenic integrity objectives. Acres affected are unknown at this time. Stands of spruce trees on some districts are approaching 100 percent mortality. The negative response from the public is substantial. Some surveys have been done and records kept of this public concern. Dead gray trees and dying red trees can be seen from most state highways and Forest roads.

Dispersed Recreation and Wilderness

In 2008 the Forest monitored 26 non-motorized and motorized trails for use. Both active infrared and electromagnetic devices were used for counts. The monitoring occurred on 7 trails on the Pine Valley Ranger District, 12 trails on the Cedar City Ranger District, 5 trails on the Powell Ranger District, and 2 trails on the Escalante Ranger District.

Dispersed recreation use numbers increased by 6 percent from the previous year. Most trail counts were static or slightly higher. These findings may be due to a downturn in the economy. Most of the high use trails tend to be either scenic destination and/or mechanized/motorized routes.

Further monitoring of these trails is necessary to create a database with baseline data. The Dixie National Forest has been consistently monitoring dispersed recreation use for the last four years on most trails listed. In order to monitor change over time, trail data needs to be collected, analyzed, and stored annually. With an increasing population growth and an increasing recreating public, trail use is expected to increase. The Dixie National Forest is especially susceptible to increased use due to its proximity to the fast growing city of Las Vegas. In addition, the Dixie National Forest provides many recreation opportunities for motorized recreation, which is the fastest growing sport in the United States.

Cultural (Heritage) Resources

Completion of Cultural Resource Investigations For All Site-disturbing Activities Where No Site Inventory Has Been Completed

Federal law requires the Forest Service to conduct surveys for Historical and Archaeological Resources prior to all ground-disturbing projects. During FY 2008 we surveyed or evaluated 25 projects totaling approximately 2,500 acres. During these surveys we found 30 archaeological and historical sites. Of these only seven were found not to be eligible for the National Register of Historic Properties. All Historic Properties identified were avoided by all project activities. The Forest has met all the requirements in the law regarding cultural resources.

Facilities

Road and Bridge Construction and Reconstruction

In 2008, 6.9 miles of road were reconstructed or improved and no miles of new road were constructed. The Forest Plan predicted that construction and reconstruction through 1990 would consist of 2 miles for public works, 28 miles for timber development, and 5 miles for oil and gas activities, totaling 35 miles. Timber harvest is occurring at about 25 percent of levels during the 1980s, which accounts for fewer miles constructed or reconstructed than estimated in the 1986 Forest Plan.

The Little Pine Creek Bridge #30006-3.5 and the Bull Valley Bridge #30006-9.9 were reconstructed using ERFO funds in 2008.

Road Management

During 2008, all random sample condition surveys were completed for this cycle. Sampled roads include:

1. 30003 – Colie Flat
2. 30026 - Posy Lake
3. 30628 – Henrie Knolls
4. 31288 – Rock Lake

The random sampling is not large enough to determine the trend in the condition of existing roads.

Buildings

12 buildings were inspected in 2008:

1. Color Country Fire Storage
2. Cedar Horse Shed
3. Cedar Tack Shed
4. Cedar Pesticide Storage
5. Cedar Hay Shed
6. Cedar Paint Storage Building
7. Rudds Roost Como Site
8. Browse Guard Station
9. Duck Creek Visitor's Center
10. New Red Canyon Visitor's Center
11. Podunk Guard Station Old Administration Building
12. Cowpuncher Guard Station Garage

Building inspections are completed on a 5-year cycle (20% per year). Inspections reveal buildings in various states of condition. Resources are available to maintain buildings that are being used; buildings that are not used or receive low use are not maintained. If this trend continues, buildings that are not used will continue to deteriorate until they will have to be either renovated or demolished. The Facilities Master Plan identifies the disposal of most unused buildings. The methods for determining deferred maintenance have changed such that data are not comparable from year to year. No additional evaluation is necessary.

Dam Administration

All high hazard dams were inspected by the State of Utah in coordination with Forest engineering personnel. The following dams required inspection by the Forest according to the existing Memorandum of Understanding with the State of Utah, Division of Water Rights:

1. Lower Ned Adams,
2. Posy Lake,
3. Sams Mill Set Reservoir,
4. Middle Ned Adams,
5. Robs, and
6. Flat Lake.

All inspections were accomplished according to established state and federal regulations. Forest-owned dams (Pine Valley, Flat Lake, Robs, and Pine Creek) continue to be underfunded for necessary heavy maintenance and/or reconstruction.

Compliance with Utah Public Drinking Water Regulations

All drinking water systems on the Dixie National Forest have been monitored in accordance with state and federal standards in 2008.

All nitrate and subsequent sulfate monitoring returned acceptable results. One fecal coliform test exceeded the allowable maximum contaminant level. This test was taken at the Pine Lake water system. Follow-up testing showed acceptable water quality. With the required follow-up testing, all systems have had acceptable water quality test results, and have an approved status with the State of Utah.